

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Withdrawn): An olefin branched macromonomer satisfying the following

(a) and (b):

(a) its weight-average molecular weight (Mw) measured through gel permeation chromatography (GPC) falls between 400 and 200000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer.

Claim 2 (Withdrawn): The olefin branched macromonomer as claimed in claim 1, which satisfies any of the following (i), (ii) and (iii):

(i) the ratio of the temperature dependency (E_2) of the macromonomer solution viscosity to the temperature dependency (E_1) of the solution viscosity of the linear polymer which has the same type of monomer, the same chemical composition and the same intrinsic viscosity as those of the macromonomer, E_2/E_1 , satisfies the following relationship:

$$1.01 \leq E_2/E_1 \leq 2.5;$$

(ii) the ratio of the number-average molecular weight measured through GPC (GPC-Mn) to the number-average molecular weight measured through ^{13}C -NMR (NMR-Mn) of the macromonomer satisfies the following relationship:

$$(\text{GPC-Mn})/(\text{NMR-Mn}) > 1;$$

(iii) the macromonomer has branches existing not at the α - and/or β -substituents of the monomer that constitutes the macromonomer, and the number of the branches falls between 0.01 and 40 in one molecule of the macromonomer.

Claim 3 (Withdrawn): The olefin branched macromonomer as claimed in claim 1, for which the monomer to constitute it is propylene, or a combination of propylene and at least one selected from ethylene, α -olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, and of which the propylene content falls between 0.1 and 100 mol%.

Claim 4 (Withdrawn): The olefin branched macromonomer as claimed in claim 1, for which the monomer to constitute it is ethylene, or a combination of ethylene and at least one selected from α -olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, and of which the ethylene content falls between 50 and 99.9 mol%.

Claim 5 (Withdrawn): The olefin branched macromonomer as claimed in claim 1, for which the monomer to constitute it is ethylene or propylene.

Claim 6 (Currently Amended): An olefin graft copolymer obtained by copolymerizing the an olefin branched macromonomer of claim 1 which satisfies the following (a) and (b):

(a) its weight-average molecular weight (Mw) measured through gel permeation chromatography (GPC) falls between 400 and 200000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer, wherein the macromonomer satisfies any of the following (i), (ii) and (iii):

(i) the ratio of the temperature dependency (E_2) of the macromonomer solution viscosity to the temperature dependency (E_1) of the solution viscosity of the linear polymer which has the same type of monomer, the same chemical composition and the same intrinsic viscosity as those of the macromonomer, E_2/E_1 , satisfies the following relationship:

$$1.01 \leq E_2/E_1 \leq 2.5;$$

(ii) the ratio of the number-average molecular weight measured through GPC (GPC-Mn) to the number-average molecular weight measured through ^{13}C -NMR (NMR-Mn) of the macromonomer satisfies the following relationship:

$$\text{(GPC-Mn)/(NMR-Mn)} > 1;$$

(iii) the macromonomer has branches existing not at the α - and/or β -substituents of the monomer that constitutes the macromonomer, and the number of the branches falls between 0.01 and 40 in one molecule of the macromonomer,

with at least one comonomer selected from ethylene, propylene, α -olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, in the presence of a metallocene catalyst.

Claim 7 (Withdrawn): An olefin graft copolymer obtained by copolymerizing the olefin branched macromonomer of claim 1 with at least one comonomer selected from ethylene, propylene, α -olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, in the presence of a Ziegler-Natta catalyst.

Claim 8 (Currently Amended): The olefin graft copolymer as claimed in claim 6, which satisfies the following (1) and/or (2):

(1) its intrinsic viscosity $[\eta]$ measured in a solvent decalin at 135°C falls between 0.3 and 15 dl/g;

(2) it contains from 0.01 to 70% by weight of repeat units derived from the olefin branched macromonomer satisfying the following (a) and (b):

(a) its weight-average molecular weight (M_w) measured through gel permeation chromatography (GPC) falls between 400 and 200000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer.

Claim 9 (Withdrawn): An olefin resin composition comprising 100 parts by weight of a thermoplastic resin, and from 0.05 to 70 parts by weight of the olefin graft copolymer of claim 6.

Claim 10 (Withdrawn): The olefin resin composition as claimed in claim 9, of which the relaxation rate of the long-term relaxation component measured through solid $^1\text{H-NMR}$ ($1/R_1$) falls between 1.0 and 2.0 (1/sec).

Claim 11 (Withdrawn): The olefin resin composition as claimed in claim 9, of which the ratio of the relaxation rate of the long-term relaxation component measured through solid $^1\text{H-NMR}$ ($1/R_1$) falls between 1.0 and 2.0 (1/sec) to the relaxation rate ($1/R_1$)₀ of the long-term relaxation component, measured through solid $^1\text{H-NMR}$, of a resin composition not containing the propylene branched macromonomer satisfying the following (a) and (b):

(a) its weight-average molecular weight (M_w) measured through gel permeation chromatography (GPC) falls between 400 and 200000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer, $[(1/R_1)/(1/R_1)_0]$, satisfies the following relationship:

$$[(1/R_1)/(1/R_1)_0] \geq 1.01.$$

Claim 12 (Withdrawn): A propylene macromonomer satisfying the following (a), (b) and (c):

(a) its weight-average molecular weight (M_w) measured through gel permeation chromatography (GPC) falls between 800 and 500000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer;

(c) its propylene content falls between 50 and 100 mol%.

Claim 13 (Withdrawn): The propylene macromonomer as claimed in claim 12, for which the monomer to constitute it is propylene, or a combination of propylene and at least one selected from ethylene, α -olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes.

Claim 14 (Withdrawn): The propylene macromonomer as claimed in claim 12, for which the monomer to constitute it is ethylene and propylene.

Claim 15 (Currently Amended): An olefin graft copolymer obtained by copolymerizing the a propylene macromonomer of claim 12 satisfying the following (a), (b) and (c):

(a) its weight-average molecular weight (Mw) measured through gel permeation chromatography (GPC) falls between 800 and 500000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer;

(c) its propylene content falls between 50 and 100 mol%,

with at least one comonomer selected from ethylene, propylene, α -olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, in the presence of a metallocene catalyst, which olefin graft copolymer satisfies the following (1), (2), (3) and (4):

(1) its intrinsic viscosity $[\eta]$ measured in a solvent decalin at 135°C falls between 0.7 and 12 dl/g;

(2) the ratio of the weight-average molecular weight (Mw) to the number-average molecular weight (Mn) thereof measured through GPC, Mw/Mn, falls between 1.5 and 3.0;

(3) it contains from 0.01 to 40% by weight of repeat units derived from the propylene macromonomer;

(4) it has no terminal vinyl group in the olefin graft copolymer.

Claim 16 (Withdrawn): An olefin graft copolymer obtained by copolymerizing the propylene macromonomer of claim 12 with at least one comonomer selected from ethylene, propylene, α -olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, in the presence of a Ziegler-Natta catalyst.

Claims 17-18 (Cancelled).

Claim 19 (Withdrawn): An olefin resin composition comprising 100 parts by weight of a thermoplastic resin, and from 0.05 to 70 parts by weight of the propylene graft copolymer of claim 15.

Claim 20 (Withdrawn): The olefin resin composition as claimed in claim 19, of which the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec).

Claim 21 (Withdrawn): The olefin resin composition as claimed in claim 19, of which the ratio of the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec) to the relaxation rate ($1/R_1$)₀ of the long-term relaxation component, measured through solid ^1H -NMR, of a resin composition not containing the propylene graft copolymer obtained by copolymerizing the propylene macromonomer of claim 12 with at least one comonomer selected from ethylene,

propylene, α -olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, in the presence of a Ziegler-Natta catalyst satisfying the following (a), (b) and (c):

(a) its weight-average molecular weight (Mw) measured through gel permeation chromatography (GPC) falls between 800 and 500000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer;

(c) its propylene content falls between 50 and 100 mol%, $[(1/R_1)/(1/R_1)_0]$, satisfies the following relationship:

$$[(1/R_1)/(1/R_1)_0] \geq 1.01.$$

Claim 22 (Withdrawn): The olefin graft copolymer as claimed in claim 7, which satisfies the following (1) and/or (2):

(1) its intrinsic viscosity $[\eta]$ measured in a solvent decalin at 135°C falls between 0.3 and 15 dl/g;

(2) it contains from 0.01 to 70% by weight of the olefin branched macromonomer satisfying the following (a) and (b):

(a) its weight-average molecular weight (Mw) measured through gel permeation chromatography (GPC) falls between 400 and 200000.

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer.

Claim 23 (Withdrawn): An olefin resin composition comprising 100 parts by weight of a thermoplastic resin, and from 0.05 to 70 parts by weight of the olefin graft copolymer of claim 7.

Claim 24 (Withdrawn): An olefin resin composition comprising 100 parts by weight of a thermoplastic resin, and from 0.05 to 70 parts by weight of the olefin graft copolymer of claim 8.

Claim 25 (Withdrawn): An olefin resin composition comprising 100 parts by weight of a thermoplastic resin, and from 0.05 to 70 parts by weight of the olefin graft copolymer of claim 22.

Claim 26 (Withdrawn): The olefin resin composition as claimed in claim 23, of which the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec).

Claim 27 (Withdrawn): The olefin resin composition as claimed in claim 24, of which the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec).

Claim 28 (Withdrawn): The olefin resin composition as claimed in claim 25, of which the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec).

Claim 29 (Withdrawn): The olefin resin composition as claimed in claim 23, of which the ratio of the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec) to the relaxation rate ($1/R_1$)₀ of the long-term relaxation component, measured through solid ^1H -NMR, of a resin composition

not containing the propylene branched macromonomer, $[(1/R_1)/(1/R_1)_0]$ satisfying the following (a) and (b):

(a) its weight-average molecular weight (M_w) measured through gel permeation chromatography (GPC) falls between 400 and 200000,

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer, $[(1/R_1)/(1/R_1)_0]$, satisfies the following relationship:

$$[(1/R_1)/(1/R_1)_0] \geq 1.01.$$

Claim 30 (Withdrawn): The olefin resin composition as claimed in claim 24, of which the ratio of the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec) to the relaxation rate $(1/R_1)_0$ of the long-term relaxation component, measured through solid ^1H -NMR, of a resin composition not containing the propylene branched macromonomer, $[(1/R_1)/(1/R_1)_0]$ satisfying the following (a) and (b):

(a) its weight-average molecular weight (M_w) measured through gel permeation chromatography (GPC) falls between 400 and 200000,

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer, $[(1/R_1)/(1/R_1)_0]$, satisfies the following relationship:

$$[(1/R_1)/(1/R_1)_0] \geq 1.01.$$

Claim 31 (Withdrawn): The olefin resin composition as claimed in claim 25, of which the ratio of the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec) to the relaxation rate $(1/R_1)_0$ of the long-term relaxation component, measured through solid ^1H -NMR, of a resin composition

not containing the propylene branched macromonomer, $[(1/R_1)/(1/R_1)_0]$ satisfying the following (a) and (b):

(a) its weight-average molecular weight (M_w) measured through gel permeation chromatography (GPC) falls between 400 and 200000,

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer, $[(1/R_1)/(1/R_1)_0]$, satisfies the following relationship:

$$[(1/R_1)/(1/R_1)_0] \geq 1.01.$$

Claim 32 (Withdrawn): The olefin graft copolymer as claimed in claim 16, which contains from 0.01 to 40% by weight of the propylene macromonomer satisfying the following (a), (b) and (c):

(a) its weight-average molecular weight (M_w) measured through gel permeation chromatography (GPC) falls between 800 and 500000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer;

(c) its propylene content falls between 50 and 100 mol%.

Claim 33 (Withdrawn): The propylene graft copolymer as claimed in claim 16, which satisfies the following (1) and/or (2)

(1) its intrinsic viscosity $[\eta]$ measured in a solvent decalin at 135°C falls between 0.3 and 15 dl/g;

(2) the ratio of the weight-average molecular weight (M_w) to the number-average molecular weight (M_n) thereof measured through GPC, M_w/M_n , falls between 1.5 and 4.5.

Claim 34 (Cancelled).

Claim 35 (Withdrawn): The propylene graft copolymer as claimed in claim 32, which satisfies the following (1) and/or (2)

(1) its intrinsic viscosity $[\eta]$ measured in a solvent decalin at 135°C falls between 0.3 and 15 dl/g;

(2) the ratio of the weight-average molecular weight (M_w) to the number-average molecular weight (M_n) thereof measured through GPC, M_w/M_n , falls between 1.5 and 4.5.

Claim 36 (Withdrawn): An olefin resin composition comprising 100 parts by weight of a thermoplastic resin, and from 0.05 to 70 parts by weight of the propylene graft copolymer of claim 33.

Claim 37 (Cancelled).

Claim 38 (Withdrawn): An olefin resin composition comprising 100 parts by weight of a thermoplastic resin, and from 0.05 to 70 parts by weight of the propylene graft copolymer of claim 35.

Claim 39 (Withdrawn): The olefin resin composition as claimed in claim 33, of which the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec).

Claim 40 (Withdrawn): The olefin resin composition as claimed in claim 34, of which the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec).

Claim 41 (Withdrawn): The olefin resin composition as claimed in claim 35, of which the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec).

Claim 42 (Withdrawn): The olefin resin composition as claimed in claim 36, of which the ratio of the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec) to the relaxation rate ($1/R_1$)₀ of the long-term relaxation component, measured through solid ^1H -NMR, of a resin composition not containing the propylene graft copolymer obtained by copolymerizing a propylene macromonomer satisfying the following (a), (b) and (c):

(a) its weight-average molecular weight (M_w) measured through gel permeation chromatography (GPC) falls between 800 and 500000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer;

(c) its propylene content falls between 50 and 100 mol%, with at least one comonomer selected from ethylene, propylene, α -olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, in the presence of a Ziegler-Natta catalyst satisfying the following (a), (b) and (c):

(a) its weight-average molecular weight (M_w) measured through gel permeation chromatography (GPC) falls between 800 and 500000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer;

(c) its propylene content falls between 50 and 100 mol%, $[(1/R_1)/(1/R_1)_0]$, satisfies the following relationship:

$$[(1/R_1)/(1/R_1)_0] \geq 1.01.$$

Claim 43 (Cancelled).

Claim 44 (Withdrawn): The olefin resin composition as claimed in claim 38, of which the ratio of the relaxation rate of the long-term relaxation component measured through solid ^1H -NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec) to the relaxation rate $(1/R_1)_0$ of the long-term relaxation component, measured through solid ^1H -NMR, of a resin composition not containing the propylene graft copolymer obtained by copolymerizing a propylene macromonomer satisfying the following (a), (b) and (c):

(a) its weight-average molecular weight (M_w) measured through gel permeation chromatography (GPC) falls between 800 and 500000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer;

(c) its propylene content falls between 50 and 100 mol%, with at least one comonomer selected from ethylene, propylene, α -olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, in the presence of a Ziegler-Natta catalyst satisfying the following (a), (b) and (c):

(a) its weight-average molecular weight (M_w) measured through gel permeation chromatography (GPC) falls between 800 and 500000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer;

(c) its propylene content falls between 50 and 100 mol%, $[(1/R_1)/(1/R_1)_0]$, satisfies the following relationship:

$$[(1/R_1)/(1/R_1)_0] \geq 1.01.$$

DISCUSSION OF THE AMENDMENT

Claim 6 has been amended into independent form, and by incorporating the subject matter of Claims 1 and 2 therein. Claim 8 has been amended by inserting the term --repeat units derived from-- after "by weight of", as suggested by the Examiner. Claim 15 has been amended into independent form by incorporating the subject matter of Claim 12 therein, and by inserting four clauses, as supported in the specification at page 112, lines 12-18 and page 110, lines 21-22 and lines 15-17. Finally, Claim 17, 18, 34, 37 and 43 have been cancelled.

No new matter has been added by the above amendment. Claims 6, 8 and 15 are now active. Claims 1-5, 7, 9-14, 16, 19-33, 35, 36, 38-42 and 44 stand withdrawn from consideration as directed to a non-elected invention or a non-elected species.¹

Note that if the presently-active claims are patentable, Claims 9-11, 19-21, 24, 27, and 30 are necessarily patentable as well.

¹ While the Examiner lists Claim 22 as active, this appears to be a mistake since Claim 22 depends on Claim 7, which is directed to a non-elected species. Also, the Office Action Summary page lists a Claim 45 as withdrawn from consideration. There is no Claim 45.